

Roof Curb Assembly

Background:

The present invention relates to roof curb assemblies, which are used to mount air
4 conditioners or other utilities on rooftops. There are many different types of construction
for these assemblies, from a welded assembly that is fabricated entirely on the ground
and then is lifted onto the rooftop using a crane or other heavy equipment, to assemblies
with special fasteners that can be assembled in place on the rooftop.

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Summary:

The present invention provides an assembly that is made in pieces that can readily be assembled without the use of tools or fasteners. This makes assembly much simpler
4 than in prior art designs.

Brief Description of the Drawings:

Figure 1 is a schematic showing a curb assembly of the present invention mounted on a roof opening;

4 Figure 2 is an exploded perspective view of a curb assembly made in accordance with the present invention;

Figure 3 is a perspective of the assembly of Figure 2 partially assembled;

Figure 4 is the same view as Figure 3 but with the assembly further assembled;

8 Figure 5 is the same view as Figure 4 but with the assembly further assembled;

Figure 6 is a broken-away exploded perspective view showing a connector portion of the assembly of Figure 2;

Figure 7 is the same view as Figure 6 but with the parts assembled;

12 Figure 8 is a view taken along the section 8-8 of Figure 7;

Figure 9 is a broken-away view of one of the corners of the curb of Figure 2 as it is being assembled;

Figure 10 is the same view as Figure 9, but with the assembly further assembled;

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Figure 11 is the same view as Figure 10, but with the assembly further assembled.

Description of the Preferred Embodiment:

Figures 1-11 show a first embodiment of a roof curb 10 made in accordance with the present invention. As shown in Figure 5, the roof curb 10 is made up of a plurality of exterior planar panels 12, 14 connected together to form a rectangular box. As shown in Figure 1, the curb 10 rests on top of a roof 16, surrounding an opening 18 in the roof 16, and an air conditioner unit 20 or other utility rests on top of the curb 10, thereby providing access from the air conditioner unit 10 through the curb 10 and through the roof 16.

The air conditioning unit 20 may have various ducts (not shown) which are to communicate through the curb 10, and, as shown in Figure 5, the curb 10 may be designed with various-sized openings 22 to receive those ducts. In addition, portions of the curb 10 may be blocked off with plates 24, which rest on top of the curb 10.

Referring to Figures 2-5, this particular curb 10 is made up of two long exterior planar panels 12 of equal length and two short exterior planar panels 14 of equal length, which, when connected together with adjacent panels at right angles, forms a rectangular box. Each of the panels 12, 14 has a top edge 30, a bottom edge 32, an interior surface 34, and exterior surface 36, and first and second ends 38, 40. The panels 12, 14 are made from a flat sheet of metal that has been stamped. The top and bottom edges 30, 32 are curved outwardly. The ends 38, 40 of the long panels 12 include bent portions 42 that have been bent inwardly at a right angle to the main portion of the panel 12. Near the ends of the shorter panels 14 are formed straps 44. These bent portions 42 secure the side panels 12 to the end panels 14 through the straps, as will be described in more detail

later. Also, intermediate panels 50, 50A are secured to the exterior panels 12 or 14 or to each other by means of similar bent portions and straps.

Figures 6-8 show one of the intermediate panels 50 connected to one of the exterior panels 12. The intermediate panel 50 has a right angle bend 42A at one end. This right angle bend 42A has been stamped to form a downwardly-extending tab 52, which is secured to the right angle bend 42A at one end and is free at the other end 54. The tab 52 has a stamped projection 56 having a generally circular cross-section and projecting parallel to the end-to-end elongated direction of the panel 50. The exterior panel 12 has a strap 44, which has been stamped from the flat metal piece. The strap 44 extends in the lengthwise direction of the panel 12 and is connected to the exterior panel 12 at both ends. It defines a top edge 60 and a bottom edge 62 and a circular opening 64, which is sized to receive the projection 56.

In order to assemble the interior panel 50 to the exterior panel 12, the bent portion 42A is brought into alignment with the interior surface 34 of the exterior panel 12, and the free end 54 of the tab 52 is inserted between the top edge 60 of the strap 44 and the inner surface 34 of the panel 12 and is moved downwardly until the projection 56 pops through the opening 64 in the strap 44. At this point, the interior panel 50 and the exterior panel 12 are secured together, with the bent portion 42A pressing against the interior surface 34 of the panel 12 and the tab 52 pressing against the exterior surface of the strap 44, and the projection 56 and opening 64 preventing relative movement between the tab 52 and the strap 44. Thus, simply by cutting and bending the flat sheet material, the panels have been formed so that they can be assembled and secured together without

the need for additional fasteners or tools. This makes assembly very simple and avoids the problem of losing small parts such as fasteners.

The corners of the box are formed in a similar manner, except, in this

4 embodiment, there are three tabs 52 and three straps 44 at each corner joint. Figures 9-11 show schematically how the corners are assembled. The three horizontal straps 44A-C are not evenly spaced. Instead, the bottom strap 44A is spaced a larger distance away from the center strap 44B than is the upper strap 44C. The tabs 54A-C are also similarly
8 spaced apart from each other, ensuring that the panels 12, 14 can only be assembled in the correct orientation. Also, the distance from the bottom edge of each tab 54A-C to its respective projection 56A-C differs from one tab to the next, with the distance being greatest in the bottom tab 54A, less in the center tab 54B, and still less in the upper tab
12 54C. This difference in distance permits the tabs to be inserted into their respective straps one at a time, helping facilitate assembly, so that only the lowest tab 54A has to be aligned with its respective strap 44A at first, and, once that lowest tab 54A is started into its respective strap 44A, it helps align the second tab 54B with its strap 44B, and so forth.

16 Figure 9 shows the starting position, with the bottom tab 54A just starting into its strap 44A. This helps align the bottom edge of the middle tab 54B with its respective strap 44B. Next, Figure 10 shows the bottom tab 54A progressing further downwardly, as the second tab 54B begins entering into the slot formed by its strap 44B. This helps
20 align the top tab 54C with its respective strap 44C. Figure 11 shows the panel 12 having slid down into proper alignment with the panel 14, with all three tabs 54A-C extending through their respective straps 44A-C, and all three projections 56A-C popping through their respective openings 64A-C at the same time, once the panels have reached their

final positions. It will be noted in Figure 2 that an intermediate panel 50 has an intermediate strap 44, which receives the tab from the bent end of another intermediate panel 50A, and so forth, so that the entire curb 10 is assembled using these tabs and

4 straps, simply aligning the appropriate panels and snapping them into position, without requiring additional connectors or tools. The projections 56 and openings 64 provide positive engagement between the assembled members, so they do not come apart

8 accidentally. Figures 3-5 show various portions assembled together in various stages of assembly. However, they do not show the order of assembly that is normally used.

Typically, the rectangular box will be formed first from the two pairs of exterior planar panels 12, 14, and then the intermediate panels 50 will be inserted, followed by the other intermediate panels 50A. Finally, the plates 24 will be placed on top, extending from one

12 side panel 12 to the other, with their end lips hooked over the top edges 30 of the panels 12.

It will be obvious to those skilled in the art that various modifications may be made to the embodiment described above without departing from the scope of the present

16 invention. For example, while the straps 44 are all oriented in the horizontal direction, and this is preferred, they may be oriented in another direction, such as vertical. While

the tabs are shown on the bent ends, the straps could be on the bent ends, and the tabs could be on the flat panels. While the panels are referred to as planar, they may include

20 reinforcing ribs or other non-planar features, while still having a generally planar shape.

Various other changes may also be made while still permitting assembly and positive engagement of the parts without requiring connectors or tools.